



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Public Health Reports

Treasury Department, United States Marine-Hospital Service. Published in accordance with act of Congress approved February 15, 1893.

VOL. XII.

WASHINGTON, D. C., MAY 21, 1897.

NO. 21.

UNITED STATES.

[Reports to the Supervising Surgeon-General United States Marine-Hospital Service.]

The bubonic plague bacillus as studied at the Pasteur Institute.

[Continued.]

PARIS, May 2, 1897.

SIR: A short time ago I had the honor to submit for your consideration certain observations in regard to the bubonic plague, or pest, being the result of my studies and investigations at the Institute Pasteur. In continuation of the same subject I would beg to submit the following:

In the former report I made mention of toxines prepared by the simple filtration through a Pasteur-Chamberland filter of a bouillon culture of the bacillus of pest, the liquid being thus deprived of its active microbial growth, and the product causing the death of animals, when injected subcutaneously, in a period of time varying according to the virulence of the culture, the length of time which was allowed for the growth, the size and weight of the animals, and certain other conditions, the nature of which is not as yet altogether understood. Since that time I have been conducting experiments with a toxine of pest, but one of an entirely different nature. If to the liquid mentioned before there be added ammonium sulphate, there is precipitated a varying amount of an amorphous, yellowish-brown powder, which when dried is soluble in cold water, forming a tolerably clear solution, and which when injected in doses of 0.0025–0.005 gram into a white mouse of from 18 to 25 grams weight causes the death of the animal in from twelve to twenty-four hours with all the symptoms of a profound toxæmia. After death there is found an extensive cedema around the site of injection, the peritoneal cavity contains a serous exudate, the spleen is enlarged, and other quite characteristic appearances are presented. The substance is, therefore, a true toxine, and one powerful and rapidly fatal. Heated to 56° C. its toxicity is much diminished; heated to 85° C. for an hour the toxic property is altogether destroyed, though the precise point between these temperatures at which the toxic properties are lost is still a matter of experiment, for me, at least.

Nor is its simple toxicity the only interesting feature about this potent substance. Injected in the above-named doses into animals which are at the same time protected by an injection of the pest antitoxine of proved potency, the death of the animal is averted, sometimes with a varying degree of illness, sometimes without the slightest manifestation of discomfort. Apart from the interest attaching to this experiment as a demonstration of the efficiency of the antitoxine as a remedial agent, it establishes the important point that the pest antitoxine is an antitoxine in the true sense of the word, and is not an alexine, or an agent exerting its power by direct action on the microbe itself.

Nor does interest in the substance cease here, for it has been demonstrated by actual experiment that larger animals, especially horses, treated by repeated increasing doses of this precipitated substance, in time acquire an immunity against its action, and that when this is the case the blood serum of the said animal is found to yield an antitoxine of remarkably high *remedial* power. The word remedial is emphasized for the reason that animals treated by the injection of cultures of the pest bacillus in time acquire a certain immunity, but that their serum possesses powers more of an immunizing than of a remedial nature. These points are interesting from a practical as well as a scientific standpoint, for the reason that it opens up the possibility of preparing pest antitoxine without the necessity of injecting animals with the pest culture itself, a point I need not point out as one of great desirability, for if an animal being treated with pest culture dies, as will sometimes happen, that animal dies of pest pure and simple, and there is a certain chance of the spread of the disease, but if being treated with toxines, and death should unfortunately ensue, the sole cause of death is a poisoning by a chemical agent, and there is no attendant danger.

A point in the use of this agent for the preparation of antitoxines is that its solution must be freshly prepared, as it seems to be changed by oxidation when the solution is kept from day to day. In this way were explained some exceedingly perplexing results which I reached as the finale of quite a train of experiments; the lesson thus practically learned being worth the time apparently lost.

The difference in the potency of the antitoxines prepared by the two methods given above is easily explained, but as the explanation would require an extensive excursion into the whole philosophy of the formation of antitoxines, it will not be given here.

I would again beg to emphasize a point of which I made brief mention in my last letter, viz, that not all horses lend themselves alike to the formation of antitoxine, indeed some are perfectly useless for the purpose. I am informed that with some horses it is quite possible to prepare in three months an antitoxic serum of standard strength, that is to say, one the injection of one-twentieth cubic centimeter of which will preserve a mouse of 20 grams in weight against a lethal dose of pure pest culture. Others, after six months or more of preparation, will only yield a serum which is either not at all protective, or protective only in doses of much increased size, and the standard of potency which has been adopted at the Pasteur Institute is that as above given.

There are some other features of interest about the antitoxic serum which I would like to briefly allude to here. I have mentioned before a property which seemed to be possessed in varying degree by the antitoxine from different animals of producing a coagulation and precipitation when added to a turbid emulsion of pest culture in sterile bouillon or water. The same thing may be observed under the microscope when to a hanging drop of the antitoxine there is added a minute drop of the

turbid emulsion of pest culture. There is at once seen an agglutination of the bacilli. The proportions in which the reaction will be produced can not at this time be definitely stated by me. The reaction was distinctly marked when the dilutions of the antitoxine were respectively one-twentieth and one-fiftieth. It was still noticeable when the dilution reached 1-100, but the matter is still under investigation. Further, two drops of the heart blood of a mouse just dead of the pest were added to 2 cubic centimeters of water, and the reaction was distinctly visible, though no further test was made at the time. This, however, establishes the value of the procedure as a possible diagnostic test, though, as has before been said, the diagnosis of plague is usually all too easily made by more ordinary methods. The organism of pest is a perfectly nonmotile one, so that the reaction does not have the beauty of the Wyatt Johnson modification of the Widal test for typhoid, still it is well marked and interesting.

I hope that it will be distinctly borne in mind in what I have here and before described, that my work is in no way original. It would be a gross injustice to my instructor, Dr. Roux, to allow it to be supposed for a moment that such was the case. I am simply following with all possible attention the course which he lays down for me from day to day, and my work is only leading up to results which are evidently already well known to him, so that if any credit there be it is his and not mine. I hope to make further report as the work progresses.

Very respectfully,

H. D. GEDDINGS,
Passed Assistant Surgeon, U. S. M. H. S.

Smallpox in Memphis, Tenn.

MEMPHIS, TENN., May 10, 1897.

SIR: I have the honor to report as follows concerning the occurrence of additional cases of smallpox in Memphis:

On May 8 a white patient in St. Joseph's Hospital was found to be suffering from smallpox, and on yesterday, the 9th instant, 2 cases were found among colored railroad employees. All these cases were removed to the county pesthouse.

Very respectfully,

G. B. YOUNG,
Passed Assistant Surgeon, U. S. M. H. S.

*Smallpox in the United States as reported to the Supervising Surgeon-General United States Marine-Hospital Service, December 29, 1896, to May 21, 1897.**

Places.	Date.	Cases.	Deaths.	Remarks.
Alabama:				
Mobile.....	Dec. 28-Jan. 26....	2	.....
	Mar. 28.....	1	.....
	Apr. 17.....	1	.....
Union Springs.....	Mar. 21.....	.....	1	
Connecticut:				
New Haven.....	Feb. 17.....	1	.....
Florida:				
Pensacola.....	Jan. 19-Feb. 20....	13	.....	12 varioloid.
	Feb. 28-Mar. 10....	14	.....	Varioloid.
	Mar. 27-Apr. 3....	3	.....	Do.
	Apr. 10-May 1....	10	.....	Do.
	May 2-May 8....	3	.....
Escambia County (not including Pensacola).....	Dec. 2-Jan. 19....	18	.....

* For table of smallpox in the United States, etc., May 9, 1896, to December 29, 1896, see PUBLIC HEALTH REPORTS, Vol. XII, No. 1.